

Application No.: 10/582,354  
Art Unit: 3734

Amendment under 37 C.F.R. §1.111  
Attorney Docket No.: 062643

**AMENDMENTS TO THE DRAWINGS**

Please amend Figs. 1, 2, 3, 5, 6 and 7 as set forth in the attached Replacement Sheets of drawings. No new matter has been added.

### **REMARKS**

Reconsideration of this application, as presently amended, is respectfully requested. Claims 1-20 are pending in the present application. Claims 1-20 stand rejected.

### **Objection to the Drawings**

The drawings were objected to under 37 CFR §1.84(h)(2) because the various figures shown in the drawings are not separately labeled. The Examiner requires that figures 1A-C, 2A-C, 3A-C, and 5A-B should be separately labeled.

In response to the objection to the drawings, each of Figs. 1, 2, 3 and 5 has been amended to separately label the separate views.

Further, although the Examiner did not object to Fig. 7, Fig. 7 is described in the specification as “Fig. 7A” and “Fig. 7B” (see, e.g., page 7 of the specification). Accordingly, Fig. 7 has also been amended to separately label the separate views.

Furthermore, the Examiner objected to Figs. 6 and 7 because these figures are not designated with a legend, such as “Prior Art”. Figs. 6 and 7 have been amended to label these figures as “Related Art”. This is consistent with the description of Figs. 6 and 7 found, e.g., on page 40 of the specification as originally filed.

No new matter has been added. Approval and entry of the changes to the drawings are earnestly solicited.

**Amendment to the Brief Description of the Drawings section**

In connection with the changes to the drawings discussed above, the Brief Description of the Drawings section of the application has been amended such that it is consistent with the amended drawings. That is, the Brief Description of the Drawings section has been amended such that the separate views in the figures are described separately.

Further, in accordance with preferred U.S. patent application format, the Brief Description of the Drawings section has been moved from the end of the specification to page 21 of the specification (as originally filed).

**Objection to the Abstract**

The Abstract of the Disclosure was objected to because it exceeds 150 words. The Abstract of the Disclosure has been deleted and replaced with a new Abstract that is 150 words or less.

Approval and entry of the new Abstract are respectfully requested.

**Objection to the Specification**

The specification was objected to because the specification does not include appropriate headings for various sections (see Item 7 of the Office Action). The specification has been amended to include the types of section headings recommended in the guidelines provided in the Manual of Patent Examining Procedure §608.01(a). Accordingly, it is believed that the

specification now includes headings for the various sections that are in conformance with preferred U.S. practice.

Approval and entry of the amendments to the specification are earnestly solicited.

**Objections to the Claims**

Claims 1, 3-5, 7-10, 12-17, 19 and 20 were objected to for informalities. More specifically, in Item 8, pages 4-6 of the Office Action, the Examiner notes various informalities in the claims. It is noted that the objections to the claims involve asserted lack of antecedent basis for certain claim terms.

The claims have been amended to obviate the informalities noted by the Examiner. Accordingly, approval and entry of the amendments to the claims are earnestly solicited.

**Claim Rejections – 35 U.S.C. §112, second paragraph**

Claims 3, 4, 7-16 and 19 were rejected under 35 U.S.C. §112, second paragraph, for alleged indefiniteness.

It is noted that many of rejections under §112(2) asserted by the Examiner involve alleged lack of *antecedent basis* for certain claim terms. It is believed that the present amendments to the claims obviate the §112, second paragraph, rejection. Accordingly, reconsideration and withdrawal of the rejection under §112, second paragraph, are respectfully requested.

Claims 9, 12 and 13

Claims 9, 12 and 13 were rejected under §112, second paragraph, based on the assertion that the limitation “*the magnitude of a moment required for starting the bending action of the second articulation portion is larger than a moment required for the bending action of the first articulation portion*” is indefinite because it is a functional limitation that is not supported by recitation of sufficient structure in the claim to perform the function.

For the reasons set forth below, this basis of the §112, second paragraph, rejection is respectfully traversed.

First, because claims 9, 12 and 13 recite “movable means” these claims should be construed as means-plus-function claims under §112, sixth paragraph. There is no requirement that a mean-plus-function claim element recite specific structure. In fact, a means-plus-function claim element should not recite specific structure or else it is not construed as a means-plus-function claim. More specifically, as set forth in 35 U.S.C. §112, sixth paragraph “*An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.*”

Thus, the structure for performing the claimed function corresponds to the structure described in the specification and equivalents thereof. It is submitted that the specification clearly describes the structure that realizes the function “*the magnitude of a moment required for starting the bending action of the second articulation portion is larger than a moment required*

*for the bending action of the first articulation portion*” in the description of the joint structure of the second articulation portion beginning on page 32, line 15 of the specification. More particularly, on page 34, line 8 through page 36, line 6, the specification describes how the structure of the second articulation portion 51 increases the moment required for the bending action of the second articulation portion 51 compared to the moment required for bending first articulation portion 50.

Claim 10

Claim 10 was rejected based on the assertion that the limitation “*and a force generated in the direction along the rotary shaft is increased between the first coupling portion and the second coupling portion accompanied by the bending action of the second articulation portion*” is indefinite because it is a functional limitation that is not supported by recitation of sufficient structure in the claim to perform the function.

First, it is submitted that the basis for this §112(2) rejection is unclear. In particular, if a claim is believed to not recite sufficient structure to perform a function, then the claim should be treated under 112, sixth paragraph.

Second, it is submitted that the structure that performs the function “*and a force generated in the direction along the rotary shaft is increased between the first coupling portion and the second coupling portion accompanied by the bending action of the second articulation portion*” is the “first coupling portion” and the “second coupling portion”.

For example, the structure which supports the function of claim 10 may be (but is not limited to) a forward tapered shape of the first and second coupling portions. (It is noted that the “forward tapered shape” is recited in claim 11 (see also, for example, paragraphs [0101], [0102] and [0103]); however, applicant is permitted to claim broadly, such as in claim 10.) If the thicker portions in the forward tapered shape come to overlap each other accompanied by the bending action, its force, contact pressure or friction torque increase as compared with a force acting between the two members at the joint portion 51a when the articulation portion is not bent (bending angle: 0 deg.).

However, the structure to support the above-noted function of claim 10 is not limited to “a forward tapered shape.” For example, it is also possible interference fit and to realize by the interference fit or the spring washer (see, e.g., paragraphs [0109] and [0110]). The term of “the interference fit” means that the gap between the joint portions 51a is a minus.

In view of the foregoing, reconsideration and withdrawal of the rejection under §112, second paragraph, are respectfully requested.

#### **Claims Rejections – 35 U.S.C. §102**

Claims 1-9 and 12-16 were rejected under 35 U.S.C. §102(b) as being anticipated by **Yamashita et al.** (Multi-Slider Linkage Mechanism for Endoscopic Forceps”, Oct. 2003). Claim 19 was rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over **Yamashita et al.** (Multi-Slider Linkage Mechanism for Endoscopic Forceps”, Oct. 2003) in view of **Barry** (USP 5,928,136).

The independent claims will be addressed separately below.

**Claim 1**

Independent claim 1 has been amended to clarify aspects of the present invention. In particular, claim 1 has been amended to clarify the airtight portion that holds the link mechanism. Support for the amendments to claim 1 is provided, e.g., in Fig. 4 and the corresponding description thereof.

Independent claim 1 is directed to an embodiment, such as shown in Fig. 4, having a link guide portion 26 that is sealed to prevent gas leakage (see, e.g., page 29, lines 8-15 of the specification as originally filed).

The Examiner relies on Figs. 1 and 5 and page 2579, first paragraph on the right hand side of **Yamashita** to teach the features of claim 1.

Page 2579, first paragraph on the right hand side of **Yamashita** discloses the following:

“Two linkages and one stainless steel wire were connected to three linear-drive units. The unit consisted of lead screw, brushless DC-servomotor and slide type potentiometer which detected the displacement of the lead screw (M3 x 0.5), to do feedback control. Three units were arranged in the shape of an equilateral triangle (Fig. 9), settled in an acrylics cylinder with inner diameter of 36 mm *to prevent a gas leak under pneumoperitoneum.*” [“Pneumoperitoneum” is air or gas in the abdominal (peritoneal) cavity.]

As best understood, it appears that the Examiner considers that the acrylic cylinder of **Yamashita** corresponds to the claimed “air tight member”. According to **Yamashita**, linear



drive units, which respectively consist of a lead screw, brushless DC-servomotor and potentiometer, are settled in the acrylic cylinder. See Fig. 5 of **Yamashita**.

However, it is respectfully submitted that the **Yamashita** reference does not disclose “*an air-tight link guide portion provided in the hollow portion of the cylindrical frame that holds and guides the link mechanism as the link mechanism moves to transmit the drive power to the movable means*” as presently recited in claim 1.

As discussed above, the Examiner apparently considers the acrylic cylinder of **Yamashita**, in which linear-drive units respectively consisting of a lead screw, a brushless DC-servomotor and a slide type potentiometer are settled, to correspond to the claimed “air tight member”. However, the acrylic cylinder of **Yamashita** is not “*an air-tight link guide portion provided in the hollow portion of the cylindrical frame that holds and guides the link mechanism as the link mechanism moves to transmit the drive power to the movable means*” as presently recited in claim 1.

#### **Claim 5**

Independent claim 5 presently recites “an air-tight link guide portion provided in the hollow portion of the cylindrical frame that holds and guides the link mechanism as the link mechanism moves to transmit the drive power to the movable means” in a manner similar to claim 1. It is submitted that this feature recited in claim 5 patentably distinguishes over the **Yamashita** reference for the same reasons discussed above with respect to claim 1.

**Claims 9, 12 and 13**

Independent claims 9, 12 and 13 are directed to an embodiment of the invention comprising a “movable means” having first and second articulation portions constructed such that *“a magnitude of a moment required for starting the bending action of the second articulation portion is larger than a moment required for the bending action of the first articulation portion.”*

The Examiner applies the **Yamashita** reference against claims 9, 12 and 13 and asserts “the moment to start bending at the second portion is greater than that of the first portion, since the forces required for bending at the second articulation portion moves both the first and second articulation portions which would require more force than moving just one of the articulation portions.” See sentence bridging pages 9 and 10 of the Office Action.

It is respectfully submitted that the Examiner’s assertion regarding the “moment” is not correct. More specifically, **Yamashita** discloses that the bending action at the second articulation portion starts after the bending action at the first articulation portion ends. However, **Yamashita** fails to disclose that the magnitude of a moment required for starting the bending action of the second articulation portion is larger than a moment required for the bending action of the first articulation portion.

Therefore, **Yamashita** does not disclose or suggest the claimed a “movable means” having first and second articulation portions constructed such that *“a magnitude of a moment required for starting the bending action of the second articulation portion is larger than a moment required for the bending action of the first articulation portion”* as recited in

independent claims 9, 12 and 13.

**Claim 15**

Independent claim 15 has been amended to clarify the structure and function of the claimed “first joint portion”. More particularly, claim 15 now recites “wherein the first joint portion includes a projection that can be releasably connected to a drive power generating means”. Support for this amendment is provided, e.g., on page 27, lines 21-25 of applicant’s specification, which describes release of a connecting pin 21. Independent claim 15 is directed to an embodiment of the invention, such as shown in Fig. 2B or in Figs. 3A-3C, wherein a link member 23 (e.g., “drive power transmitting means”) includes a locate base 22 with the connecting pin 21 (e.g., “first joint portion”).

As best understood, the Examiner relies on the disclosure of “Two linkages and one stainless steel wire were connected to three linear-drive units” on page 2579, first paragraph, right hand column, of **Yamashita** to teach the claimed “first joint portion”. See Office Action, page 10, lines 7-9.

Thus, the **Yamashita** reference generally discloses linkages that are connected to drive units. However, the **Yamashita** reference does not disclose a joint portion connected to the end of a linkage member, the joint portion including a projection that can be releasably connected to a drive power generating means. More specifically, **Yamashita** does not disclose “a first joint portion connected to at an end of the at least one link member, wherein the first joint portion includes a projection that can be releasably connected to a drive power generating means for

generating the drive power” as presently recited in claim 15.

### **Claim 19**

Independent claim 19 was rejected under §102 in view of **Yamashita**. Alternatively, claim 19 was rejected under §103 over **Yamashita** in view of **Barry** (see page 10, Item 28 of Office Action). The rejection of claim 19 under §103 will be discussed later.

As will be discussed below, it is respectfully submitted that **Yamashita** does not disclose or suggest the “a first joint portion provided on the drive power transmitting means and a second joint portion provided on the drive power generating means are provided to be connectable and separable” and “a coupling between the first joint portion and the second joint portion is executed after the bending action member and the actuator are jointed together” as recited in claim 19.

The Examiner asserts that Figs. 5 and 9 and page 2580, left column, first paragraph, of **Yamashita** discloses the features recited in claim 19. Fig. 5 of **Yamashita** shows an endoscopic forceps manipulator wherein an end effector is separable from an unsterilizable part. Page 2580, left column, first paragraph, of **Yamashita** discloses that the handheld manipulator has a removable grip. However, **Yamashita** does not disclose the specifics of how the removable grip is achieved.

It is respectfully submitted that **Yamashita** does not disclose or suggest the “a first joint portion provided on the drive power transmitting means and a second joint portion provided on the drive power generating means are provided to be connectable and separable” and “a coupling

between the first joint portion and the second joint portion is executed after the bending action member and the actuator are jointed together” as recited in claim 19.

**Yamashita** is silent regarding the specifics of the features that allow the grip to be removable, and does not disclose a first joint portion *provided on a drive power transmitting means* and a second joint portion *provided on a drive power generating means* that are connectable and separable. Further, **Yamashita** does not disclose or suggest that the coupling between the first and second joint portions occurs after the bending action member and the actuator are joined together.

It is well established that anticipation under §102 is established only if all the elements of an invention, as stated in the claim, are identically set forth in a single prior art reference. Moreover, it is not sufficient that each element be found somewhere in the reference, the elements must be arranged as in the claim. *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Co.*, 703 F.2d 1452, 1458 (Fed. Cir. 1984).

In view of the foregoing discussion, it is respectfully submitted that **Yamashita et al.** does not disclose each and every element recited in independent claims 1, 5, 9, 12, 13, 15 and 19. Therefore, it is submitted that independent claims 1, 5, 9, 12, 13, 15 and 19 patentably distinguish over the **Yamashita et al.** reference. Dependent claims 2-4, 6-8, 14 and 16 also patentably distinguish over the **Yamashita et al.** reference by virtue of their dependency on certain independent claims. Accordingly, reconsideration and withdrawal of the rejection of claims 1-9, 12-16 and 19 under §102 are respectfully requested.

**Claim Rejections – 35 U.S.C. §103**

Claims 10 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over **Yamashita et al.** (Multi-Slider Linkage Mechanism for Endoscopic Forceps”, Oct. 2003) in view of **Kuehn et al.** (USP 6,743,239).

Claims 17-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over **Yamashita et al.** (Multi-Slider Linkage Mechanism for Endoscopic Forceps”, Oct. 2003) in view of **Barry et al.** (USP 5,928,136).

Initially, it is noted that claims 10 and 11 depend from independent claim 9 (discussed above). It is submitted that **Kuehn et al.** was not relied upon to alleviate and does not alleviate any of the deficiencies of **Yamashita et al.** discussed above with respect to claim 9. Therefore, claims 11 and 12 patentably distinguish over the combination of **Yamashita et al.** and **Kuehn et al.** for the same reasons set forth above with respect to claim 9 by virtue of their dependency thereon.

Further, claim 17 depends from independent claim 15 (discussed above). It is submitted that the **Barry et al.** reference was not relied upon to alleviate and does not alleviate any of the deficiencies discussed above with respect to independent claim 15. Therefore, claim 17 patentably distinguishes over the combination of **Yamashita et al.** and **Barry et al.** for the same reasons set forth above with respect to claim 15 by virtue of its dependency thereon.

**Claim 18**

Independent claim 18 has been amended to clarify features of the invention. In particular, claim 18 has been amended to clarify the elastic structure of the “second joint portion” and to clarify the arrangement of the “first joint portion” and the “second joint portion” that permits the connection between the first and second joint portions.

Independent claim 18 is directed to an embodiment of the invention, such as shown in Fig. 2A or in Figs. 3A-3C, having a joint arm 13 (“second joint portion”) having an opening 13c (“fitting hole”) in which a projecting portion of a first joint is fitted. The joint arm 13 is movable along the longitudinal direction of the actuator by the motor 12 (see, e.g., page 23, lines 3-6 and page 26, lines 19-21 of the specification).

As discussed in the paragraph bridging pages 12 and 13 of the Office Action, the Examiner recognizes that **Yamashita** does not explicitly disclose that “the drive power transmitting means including a first joint portion including a projection portion”. The Examiner also recognizes that **Yamashita** does not disclose “the drive power generating means including a second joint portion including an elastic body substantially perpendicular to the transmitting direction of the drive power and having a fitting hole.” See sentence bridging pages 12 and 13 of the Office Action.

**The Barry reference**

The Examiner relies on **Barry** to teach the first and second joint portions as claimed. **Barry** discloses a flexible endoscope having articulated vertebra 10. The articulated vertebra 10

consist of identical joined-together segments 11. The segments 11 are joined together by coaxial hinge pins 16.

The Examiner relies on Fig. 3 and col. 3, lines 7-55 of **Barry** to teach the claimed “first joint” and “second joint”. Fig. 3 is a cross-section of a connection portion between the segments 11. As shown in Fig. 3, the end 21 of an upper segment 11 includes a hinge aperture 24. An end 20 of a lower segment 11 includes a hinge pin 25 that is attached to a surface of the lower segment 11 with adhesive (see col. 3, lines 28-35). Joinder of segments 11 is completed when the hinge pin 25 fits into the hinge aperture 24.

The Examiner considers the portion 20 of the lower segment 11 having the hinge pin 25 to correspond to the claimed “first joint portion (20) including a projecting portion (25)”. The Examiner considers the portion 21 of the upper segment 11 having the hinge aperture 24 to correspond to the claimed “second joint portion including an elastic body (21) including a fitting hole (24)”.

First, it is submitted that neither **Yamashita** nor **Barry** disclose or suggest “a second joint portion connected to the drive power generating means, the second joint portion including an elastic body having a fitting hole, and the elastic body can be elastically urged in a direction substantially perpendicular to a transmitting direction of the drive power” as presently recited in claim 18.

The Examiner relies on the portion 21 of segment 11 having a hinge aperture 24 of **Barry** to teach the claimed “second joint portion including an elastic body”. However, **Barry** does not disclose or suggest that the portion 21 includes an elastic body that can be elastically urged in a



direction substantially perpendicular to a transmitting direction of drive power. Nothing in **Barry** discloses or suggests that the segments are elastic bodies that can be elastically urged in a direction perpendicular to a direction of drive power.

Second, it is noted that the **Barry** reference teaches a device in which the segments 11 of the endoscope are permanently attached to each other by fitting a hinge pin 25 (projecting portion) into a hinge aperture 24 (fitting hole). In contrast, according to the present invention, the “second joint” having a “fitting hole” and the “first joint” having the “projecting portion” are constructed such that they are not permanently fitted to each other.

It is submitted that neither **Yamashita** nor **Barry**, whether taken alone or in combination, disclose or suggest “wherein the second joint portion is connected to the drive power generating means and arranged with respect to the first joint portion in such a manner that the second joint portion is initially advanced substantially linearly by the drive power of the drive power generating means without the projecting portion being fitted into the fitting hole, and the projecting portion is arranged such that the second joint portion is connected to the first joint portion by advancing the second joint portion substantially linearly until the projecting portion is fitted into the fitting hole while an urging force is applied to the first joint portion by the elastic body” as recited in amended claim 18.

#### **Claim 19**

The rejection of independent claim 19 in view of **Yamashita** was discussed above. As discussed above, **Yamashita** does not disclose or suggest the “a first joint portion provided on

the drive power transmitting means and a second joint portion provided on the drive power generating means are provided to be connectable and separable” and “a coupling between the first joint portion and the second joint portion is executed after the bending action member and the actuator are jointed together” as recited in claim 19.

As will be discussed below, **Barry** does not alleviate any of these deficiencies in **Yamashita**.

The Examiner relies on **Barry** to teach first and second joint portions as claimed. **Barry** discloses a flexible endoscope having articulated vertebra 10. The articulated vertebra 10 consist of identical joined-together segments 11. The segments 11 are joined together by coaxial hinge pins 16.

The Examiner relies on Fig. 3 and col. 3, lines 7-55 of **Barry** to teach the claimed “first joint” and “second joint”. Fig. 3 is a cross-section of a connection portion between the segments 11. As shown in Fig. 3, the end 21 of an upper segment 11 includes a hinge aperture 24. An end 20 of a lower segment 11 includes a hinge pin 25 that is attached to a surface of the lower segment 11 with adhesive (see col. 3, lines 28-35). Joinder of segments 11 is completed when the hinge pin 25 fits into the hinge aperture 24.

The Examiner considers the portion 20 of the lower segment 11 having the hinge pin 25 to correspond to the claimed “first joint portion”. The Examiner considers the portion 21 of the upper segment 11 having the hinge aperture 24 to correspond to the claimed “second joint portion”.

However, it is respectfully submitted that neither **Yamashita** nor **Barry**, whether taken

alone or in combination, disclose or suggest the “a first joint portion provided on the drive power transmitting means and a second joint portion provided on the drive power generating means are provided to be connectable and separable” and “a coupling between the first joint portion and the second joint portion is executed after the bending action member and the actuator are joined together” as recited in claim 19.

**Yamashita** is silent regarding the specifics of the features that allow the grip to be removable, and does not disclose a first joint portion *provided on a drive power transmitting means* and a second joint portion *provided on a drive power generating means* that are connectable and separable. Further, **Yamashita** does not disclose or suggest that the coupling between the first and second joint portions occurs after the bending action member and the actuator are joined together.

**Barry** does not alleviate any of the above-noted deficiencies of **Yamashita**. Specifically, **Barry** discloses a flexible endoscope having multiple segments 11 that are connected together. The Examiner considers the portion 20 of a lower segment 11 having the hinge pin 25 to correspond to the claimed “first joint portion”. The Examiner considers the portion 21 of the upper segment 11 having the hinge aperture 24 to correspond to the claimed “second joint portion”.

However, first, **Barry** does not teach that the segments 11 are connectable and separable. For example, **Barry** discloses that the pins 25 are inserted into the respective apertures 24 and attached via adhesive or welding (see col. 3, lines 31-35). Thus, the segments are permanently connected.

Second, **Barry** does not disclose a first joint portion *provided on a drive power transmitting means* and a second joint portion *provided on a drive power generating means* that are connectable and separable. **Barry** does not disclose or suggest the arrangement of the segments 11 with respect to a drive power transmitting means and a drive power generating means.

Finally, **Barry** does not disclose or suggest that the coupling between the first and second joint portions occurs after the bending action member and the actuator are joined together. **Barry** is silent regarding when the coupling occurs.

Therefore, the combination of **Yamashita** and **Barry** does not disclose or suggest all elements recited in independent claim 19.

A rejection under §103 requires that the combination of teachings applied against the claims must disclose, or at least suggest, all claimed elements. The combination of **Yamashita et al.** and **Kuehn et al.** does not disclose or suggest all elements recited in claims 10 and 11. The combination of **Yamashita** and **Barry** does not disclose or suggest all claimed elements recited in claims 17-20. Accordingly, reconsideration and withdrawal of the rejections of claims 10-11 and 17-20 under §103 are respectfully requested.

**CONCLUSION**

In view of the foregoing, it is submitted that all pending claims are in condition for allowance. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are earnestly solicited.

If the Examiner believes that there are issues remaining to be resolved in this application, the Examiner is invited to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite and complete prosecution of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,  
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Attachments: Replacement sheets for Figs. 1, 2, 3, 5, 6 and 7